

Tactile Graphics Available from APH

Educators of students with visually impairments have identified tactile graphics as an area that needs improvement for legally blind students. The American Printing House for the Blind (APH) has developed "Guidelines for Design of Tactile Graphics" that is available on their website (<http://www.aph.org/edresearch/guides.htm>) and has several kits and products for those who want to make their own tactile graphics:

- Crafty Graphics Stencil Embossing Kit*
- Crafty Graphics Kit II*
- Crafty Graphics video*
- Draftsman (for making instant tactile drawings)*
- Feel 'n Peel Sheets: Carousel of Textures*
- Graphic Arts Tape*
- Graphics Starter Kit*
- Inkjet Hook Paper*
- Quick Draw Paper*
- Tangible Graphs*
- The Good Tactile Graphic (video)*
- Tactile Graphics Kit*
- Tactile Graphics Starter Kit*
- Textured Paper Collection*

Below are some of the graphics kits and other products from APH that may support classroom instruction and are available for purchase with Federal Quota Funds. For a more complete list, please see the most recent APH Product Catalog.

Social Studies

State Maps Collection: Central Region (Catalog # 1-04112-00)

A set of embossed and bold line maps for the central region of the U.S. (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, N. Dakota, Ohio, Oklahoma, S. Dakota, Texas, and Wisconsin). Add to the images with tracing white lines, craft ink, glued-on textures, or whatever materials you regularly use to produce tactile graphics. Add braille labels as needed. Because of their printed outlines, these maps are also useful to low vision users. Three (3) printed/embossed copies of each state are provided, as well as a regional map showing all the states in relation to each other. Also includes a set of print-only maps that can be copied or used as masters for "swell paper" tactile graphics. State Map Collections are also available for other regions of the United States.

World Maps (Catalog # 5-06001-00).

These excellent, thermoformed tactile maps provide a comprehensive aid to geographic instruction and orientation. The single, spiral volume collection contains tactile maps of all the continents, regions, and countries of the world. The maps include rivers, mountain ranges, bodies of water, and other physical features. Political features include country borders and capital cities. Maps of Russia and the 50 U.S. states are on larger foldout pages. The maps are labeled in braille, and facing pages have key information in braille and large print.

World at Your Fingers (Catalog # 1-01190-00)

A comprehensive set of tactile world maps that feature a large tactile reference map showing the major oceans and land masses of Earth. It uses high-contrast raised surfaces, braille and print labels, and textured lines and areas. It also shows major mountain ranges, rivers, and lines of longitude and latitude. Four additional maps are included in the set: embossed maps of the world, raised-line world map, sinusoidal (orange peel) map, and a map of Antarctica. A guidebook is included with suggested uses, general principles of map instruction, extension activities, and additional resources. Recommended for ages: 8+

Braille Transcriber's Kit: Countries & Continents (Catalog # 1-04102-00)

This is a collection of embossed & printed outlines of maps commonly found in history, geography, and social studies texts. Included are maps of Africa, Asia, Australia, Europe, the Middle East, and World (outline) and North, South and Central America. They may be used as templates to create tactile maps. You can add spur wheel lines, craft ink, glue-on textures, or braille labels.

Braille Transcriber's Kit: U.S. Maps (Catalog # 1-04101-00).

40 embossed and printed maps that provide pre-made templates for figures commonly found in history, geography, and social studies texts. The following drawings are included: North America, including Canada, The United States, and Mexico – U.S. outline (Alaska and Hawaii included, not to scale) – U.S. with 50 states outlines, western region states, Eastern region states, Original 13 Colonies, with Great Lakes included for geographic reference. Use the embossed sheets as templates as you create tactile graphics involving maps of the US. The lines thermoform well and produce readable images. Add to them with spur wheel lines, craft ink, glued-on textures, Braille labels, and other tactile graphics materials.

National Geographic Picture Atlas of Our 50 States (Catalog # 5-87431-00)

(7 volume) This comprehensive braille tactile atlas has detailed maps and information for each state. There are three maps of each state: Political map of major cities, physical map showing mountains, rivers, etc., and roadmap of interstate and highway routes.

Related APH products (see the Product Catalog for full listing):

U.S. Puzzle Map: a take-apart map of the U.S. that has proven to be fun for both blind and sighted students

Relief Map for Desk Use

Tactile Globe

Map Study I

Science and Health

Adapting Science for Students with Visual Impairments: A Handbook for Teachers & Resource Specialists
(Catalog #7-00000-00)

This handbook assists teachers, particularly those with minimal science background and/or VI experience, in making operational science activities assessable. It includes two sets of checklists that are best used prior to start of classroom and lab work. Use the Advanced Preparation Checklist to alert the teacher to orientation and safety issues. Use the Skills Checklist for preparing the student for lab and classroom activities.

Azer's Interactive Periodic Table Study Set (Catalog # 1-08856-00)

This interactive table study set makes learning about the Periodic Table of Elements accessible to students with visual impairments or blindness. The tangible materials that are included assist in the instruction and demonstration of concepts related to the arrangement of the periodic table, atomic structure, ionic and covalent bonding, and balancing of chemical equations to students who benefit from a hands-on, interactive model. Recommended ages: 10 years and up

Basic Tactile Anatomy Atlas (Catalog # 1-08845-00)

This two-volume set of thermoformed tactile graphics gives a comprehensive overview of the body.

Volume I includes illustrations of the skeletal, muscular, nervous, and endocrine systems. Volume II illustrates the structures of the cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems.

Each tactual diagram has a brief, braille description on a page to the immediate left of the illustration. A print version of each brailled text is contained in the included instructional text. Recommended ages: 12 years and up

Basic Science Tactile Graphics Kit (Catalog # 1-08850-00).

These are vacuum-formed, raised-line drawings depicting objects, concepts, and relationships that are covered in many elementary science textbooks. They can supplement, not replace, the graphics in a student's adapted textbook. This set of graphics may offer students a different presentation or vantage point from their brailled textbook graphics. Each graphic also has a title, which textbook graphics often lack.

The drawings in Basic Science Tactile Graphics employ several types of lines and textures, as well as different heights. The lines and areas with the highest relief signify the most important features in a diagram. Braille labels are on the drawings, but you may easily add to or change the labels by creating self-adhesive, braille labels of your own.

The kit includes 52 images of such items as: Leaf Shapes and Veins, Sea Anemone, Insects, Blood Flow from Artery to Vein, Parts of the Eye, Sound Frequencies, North American Air Masses, Volcano Formation, Moon's Effect on Tides, Stars in the Milky Way Galaxy, States of Matter, Water Molecule, Inside a Battery, Simple Circuit Diagram, and Forces Acting on Airplane in Flight.

Life Science Tactile Graphics (Catalog # 1-08840-00).

Vacuum-formed, full-color, raised-line tactile graphics intended to supplement the figures and diagrams in life science texts. The graphics depict organisms, processes, concepts, and patterns that are typically covered in middle- and high school life science courses. Grade Level: 5 to 12

Periodic Table of Elements Kit (Catalog # 1-08855-00)

The kit contains a durable and colorful print/Braille reference chart that comes with a reference booklet (in print & Braille) that contains additional tables listing the elements by name, atomic number, electron configuration, etc. The chart measures 22 ½ x 13 inches.

Sense of Science Astronomy (Catalog # 1-08991-00)

Recommended for ages 8 years and up, Sense of Science Astronomy includes:

- A guidebook with easy-to-follow activities, a list of vocabulary and needed materials, visual adaptations, math and language connections, science tidbits, and a list of resources and related web sites
- A variety of visual and tactile overlays that can be used alone or with a light box. Overlays include: a cross-section of the sun, lunar eclipse, Milky Way galaxy, orbit of a comet, phases of the moon, planetary orbits, relative sizes of the planets, solar eclipse, the Space Shuttle, Ursa Major/Ursa Minor, moon phases, galaxy types
- Fold-Out Astronomy Displays that features an Our Solar System Display, the Northern Circumpolar Dome, and the relative distances of the planets
- Astronomy Quick Fact Cards
- Astronomy Worksheets

Sense of Science: Animals (Catalog # 1-08990-00)

Sense of Science: Animals is for students in grades K-3 who may benefit from a multi-sensory approach to learning. The activities in this kit comply with the National Science Education Standards, especially the three major areas of Life Science Standard C: Understanding the characteristics of organisms, Understanding the life cycle of organisms, and Understanding organisms and their environments. Activities incorporate a learning objective, a list of vocabulary and needed materials, an initial inquiry, a step-by-step procedure, an extended activity, a visual adaptation, math and language connections, and a "science tidbit."

The kit includes a large print guidebook (braille edition available separately 5-08990-00) with easy-to-follow activities, a glossary, list of resources, and bibliography of related children's books. The kit contains the following components: A variety of visual and tactile overlays that can be used alone or with a light box, two trays that provide a secure working area for using the overlays with a light box, and an attractive, durable, storage container.

Overlays include Ant, Bird (side view and top view), Butterfly, and Life Cycle of a Butterfly, Fish, Mouse, Spider and Spider Web Construction, Snake, Turtle, Life Cycle of a Frog, Animal Tracks.

Sense of Science: Plants (Catalog # 1-08980-00)

The first module of a series designed to make the "world of science" accessible, understandable, and enjoyable for visually impaired students in grades K-3, and for other students who may benefit from a multi-sensory approach to learning.

The kit contains the following components: A large print guidebook, a variety of interesting visual and tactile plant and leaf type overlays, two accompanying trays, and a durable container. The overlays cover the following: bean seed (cross section), seedling, flower, leaf types (margin types, vein types and growth patterns), leaf, log cross-section, taproot system, and tree.

Tactile Demonstration Thermometer (Catalog # 1-03020-00)

The tactile demonstration thermometer allows visually impaired or blind students to conveniently and independently read, set and compare temperatures.

Several features making this thermometer especially useful to students with vision loss include the following: a two-textured, two-colored adjustable "mercury column" with an easy-grip tactile indicator; comparable Fahrenheit and Celsius scales presented in both large print and Braille on a high-contrast background; distinct tactile degree markings every 5 and 10 degrees. Grade Level: 3 and up

Tactile Food Pyramid: Primary and Secondary

Both the Primary and Secondary Tactile Food Pyramids are educational aids for use with your school district educational standards.

The Primary Kit (catalog # 1-03016-00) teaches children to make smart choices for an 1,800 calorie diet and includes a USDA classroom poster with braille documentation, 10 blank desktop tactile pyramids, and 10 punch & paste sheets for applying the sections of the pyramid. **The Secondary Kit** (catalog # 1-03018-00) teaches teens and adults to make smart choices for a 2,000-calorie diet and includes the poster and desktop pyramids.

Math

Braille Transcriber's Kit: Math (Catalog # 1-04100-0).

This collection of embossed drawings of figures frequently occurring in elementary textbooks helps transcribers create braille math texts more quickly and easily.

The included master sheets contain five each of the following raised-line drawings: rulers, number lines, protractors, unlabeled thermometers, labeled thermometers, clock faces, 1/2 inch grids, 5/8 inch grids, and 3/4 inch grids. Also included is a page in print giving the details of each embossed sheet. The embossed master sheets can be thermoformed to provide multiple copies of figures. The figures are embossed on white braille paper measuring 11 1/2 x 11 inches.

Focus in Mathematics Kit, 2nd Edition (Catalog # 1-08280-01 w/print teacher's manual)

For ages 4 and up, Grade Pre-school – 1, the kit covers numbers and number operations, geometry, algebra, measurement, data analysis, and a large number of manipulative (see the Product Catalog for more details)

Geometro Sets

Geometric materials, a set of plastic shapes (triangles, squares, pentagons, hexagons, rectangles, decagons, octagons, and isosceles triangles), provide hands-on experiences with manipulatives that aid in teaching 3-D geometry. The pieces use Velcro to adhere to each other and are easy to handle, sturdy, and safe. See the APH Product Catalog for a full list and catalog numbers.

Geometry Tactile Graphics Kit (Catalog # 1-08841-00)

This kit is a set of 52 thermoformed raised-line drawings depicting concepts, figures, and relationships that are covered in nearly all geometry textbooks. The graphics in this set provide advantages over braille textbook graphics in that they are large enough for students to measure with rulers or protractors, and they incorporate some features to make measurement easier. Two protractors, print teacher's guide, braille teacher's guide, and three-ring binder included.

MathBuilders

MathBuilders is a supplementary math program separated into eight units by content standards and grade level for grades K-3. It allows the teacher to focus on specific standards or provide remedial material for individual students. The entire set of eight units is not yet available. Each unit includes a teacher's guide with lesson plans for grades K-3, CD-ROM with *Guidelines for Teaching Math to Young Braille Users*. The manipulatives can be purchased separately.

Unit 1: Matching, Sorting, and Patterning (Catalog # 7-03560-00 w/print teacher's guide)

Includes: 58 student worksheets, 54 geometric shapes, textured shapes with Velcro backing, point symbol stickers, length sticks, and bell bracelet & rattle for creating sound patterns

Unit 6: Geometry (Catalog # 7-03563-00 w/print teacher's guide)

Includes: 34 student worksheets for additional practice, and manipulative parts (felt board, textured shapes with Velcro backing, 9 geometric shapes, 3-D shapes), a small Geometro kit for building simple 3-D shapes, and a Nemeth Code Reference Sheet

Unit 7: Fractions, Mixed Numbers, and Decimals (Catalog # 7-03564-00 w/print teacher's guide)

Includes: 32 student worksheets for additional practice. Manipulatives include 25 tactile tokens, fraction circle tray, pie shaped fraction pieces for 1, 1/2, 1/3rd, 1/4th, 1/6th, 1/8th, fraction/decimal bar tray, fraction bars for 1, 1/2, 1/3rd, 1/4th, 1/6th, 1/8th, decimal bars for .10, .20, .25, and .50, and Nemeth/large print labels for all fraction and decimal pieces.

Unit 8: Data Collection, Graphing & Probability/Statistics (Catalog # 7-03565-00 w/print teacher's guide)

Included: Teacher's guides with lesson plans for grades K-2. Manipulatives include 2 graphing grids, tactile graphing squares (36 full squares & 9 half squares), embossed graph sheets, and Feel 'n Peel stickers for point symbols, alphabets and numbers.

StackUps: Spatial Reasoning Using Cubes & Isometric Drawings (Catalog # 1-08960-00)

This is a tactile kit that systematically prepares students for the use of 2-D and 3-D shapes, specifically stacked cube arrangements. *StackUps* are a set of Velcro cubes and arrangement cards, mat plan cards and worksheets, grids, Velcro backed squares for use with the grids. It encourages students to recognize, name, build, draw, compare and sort 2- and 3-dimensional shapes; describe attributes and parts of 2-/3-dimensional shapes; and investigate and predict the results of putting together and taking apart 2-/3-dimensional shapes. Students can practice building 3-D models using the Velcro cubes in combination with tactile displays; using mat plans to construct and create stacked cube arrangements; interpreting front-right top views, and determining volume and surface areas. Recommended ages: 10 years & older.

Textured Sorting Circles and Shapes (Catalog # 1-08834-00)

This product makes it possible to create tactile Venn diagrams. It is an assortment of magnetic shapes (circles, squares, triangles, and stars) and sorting circles. The shapes are provided in a variety of textures (smooth, rough, and bumpy), sizes (large, medium and small), and colors (red, yellow, and blue). The accompanying sorting circles are also provided in a variety of colors and textures. All pieces have a magnetic backing and are ready to use on a metal surface (e.g., APH's All-In-One Board). However, Velcoins are included in the kit and can be applied to the magnetic side of the shapes and sorting circles for use on Velcro boards. Textured Sorting Circles and Shapes is intended to facilitate a variety of matching, counting, patterning, sorting, and graphing activities. Recommended ages: 5 years and up.

Related APH products (see the Product Catalog for full listing):

- Large Print Protractor*
- Tactile Protractor*
- Cranmer Abacus*
- Stick-on Tactile Ruler*
- Braille Rulers & yardsticks*
- Geometric forms*
- Consumable Number Lines*

Communication Modes & Literacy Education

IntelliTactiles Pre-Braille Concepts (Catalog # 1-08516-01)

Seven tactile overlays that can be used with the IntelliKeys keyboard or **as stand-alone worksheets** designed to develop young children's tactile discrimination skills, shape recognition ability, and understanding of many special/positional concepts. The overlays are accompanied by an interactive CD that has pre-recorded, child-narrated scripts which prompt the child to find a specific shape, texture, position or Braille dot. The child can respond to each posed question by depressing his or her selection on the keyboard to receive feedback. The recorded scripts are included in the User's Guide so that the overlays can be used as stand-alone worksheets. Recommended ages: 5 to 10 years.

Setting the Stage for Tactile Understanding (Catalog # 1-08853-00)

A set of tangible items and activities designed to assist young readers in making the transition from the exploration of real objects to the interpretation of two-dimensional representations in thermoform and simple raised-line illustrations. Advanced understanding of scale and adjustments and perspective is encouraged with the use of a specifically designed three-dimensional house model.

Kit includes:

- 12 real objects: ball, block, comb, crayon, cup, key scissors, puzzle piece, scissors, spoon, string of beads, toothbrush, and a zipper
- 12 thermoformed cards depicting each of the real objects
- 12 raised-line cards depicting each of the real objects
- 12 black-line masters of each of the real objects
- 1 activity sorting tray with Veltex backing
- 3 black tray divider cards
- 1 three-dimensional house model
- 20 tactile correct/incorrect house matching cards
- 1 package of Crayola Model Magic
- 1 package of Wikki-Stix
- 1 durable carrying case

Tactile Connections: Symbols for Communication (Catalog # 1-08837-00)

A comprehensive set of tactile symbols that are appropriate for use by visually impaired and blind students who lack a formal means of communication or who have additional disabilities. The tactile symbols are created when part of an object is mounted on a hand-sized card representing core vocabulary categories (e.g. people, places, actions, objects, etc.). The kit contains mounting cards, accessories, labeling materials, and an extensive guidebook detailing teaching strategies, a Pictorial Library of suggested core vocabulary, and card assembly instructions.

Recommended Ages: 5 and older

SQUID Tactile Activities Magazine: "A Recreational Approach to Tactile Literacy"

Issue 1 (Catalog # 1-08862-01)

Issue 2 (Catalog # 1-08862-02)

Issue 3 (Catalog # 1-08862-03)

Issue 4 (Catalog # 1-08862-04)

Issue 5 (Catalog # 1-08862-05)

Issue 6 (Catalog # 1-08862-06)

SQUID Magazine is deceptively fun: while your student enjoys a variety of activities, he or she will acquire skills needed to become a more proficient tactile reader. These puzzles, tactile mazes, counting/math tasks, coloring pages, word searches, games, and brainteasers will foster:

- Texture discrimination
- Systematic searching
- Shape identification
- Tracking line paths
- Pattern building and recognition
- Understanding symbols

Recommended Ages: 5+

Word Playhouse Kit: Letter & Word Family Cards (Catalog # 1-03562-00)

A supplemental reading program that is used to teach beginning phonics and reading skills including letter recognition, braille code recognition, decoding, vocabulary and spelling skills. The kit includes:

- 436 tiles in large print with braille overlay and a Velcro backing
- Tiles include vowels, consonants, blends, diagraphs, word endings, and word families
- Contracted and un-contracted braille of some blends and word families
- A bi-fold, felt work board and storage binder

Early Childhood

Flip-Over Concept Books

These concept books provide interactive and independent learning for young children as they build basic concepts and develop early tactile skills. The format includes tactile and full color panels that can be turned freely until the child finds adjacent panels that match each other, continue a line or pattern, complete a sequence, build an image, and so on.

Line Paths (Catalog # 1-08831-00) is the first in the series of Flip-Over Concept Books

The goal of *Line Paths* is for the child to find 3 adjacent panels that continue the same type of line path (e.g., solid, dotted, double-dotted, etc.) *Line Paths* introduces and these concepts and skills:

- Directional, spatial, and descriptive vocabulary such as curved, straight, zigzag, down, up, stair-step, etc.
- Tactile discrimination and line-tracking
- Familiarization with many types of tactile lines that will be encountered later in tactile displays (graphs, maps, etc.)
- Visual discrimination and line-tracking (Note: each of the 10 line paths is assigned a unique background color)

The book utilizes a special binding that opens and closes, allowing the teacher/parent to randomize/shuffle panels or minimize the number of line paths.

Recommended grade level: Pre-school to 3.

Parts of a Whole (Catalog # 1-08832-00)

The goal is to find two adjacent panels that complete the whole picture as shown in the first (or left-hand) panel. As the child uses Parts of a Whole, the following skills & concepts can be introduced and practiced:

- Tactile and visual discrimination of various textures & shapes
- Familiarization with basic geometry terms such as symmetry, straight, curved, half, whole, circle, oval, and star
- Global exploration (i.e., feeling the entire image in one tactile glance) vs. systematic exploration (i.e., carefully examining the specific details of an image that help to identify it)
- Exposure to basic science terms

Recommended grade level: Pre-school to 3

Tactile Treasures: Math and Language Concepts for Young Children with Visual Impairments (Catalog # 1-08842-00)

Informal assessment and teaching tool for use with children from pre-school through elementary. It helps develop an early understanding of basic concepts and vocabulary that are prerequisites for reading and math. Tactile graphics of thermoformed real objects and related scripts/stories introduce over 90 concepts such as shape, size, comparison, amount, position, and page orientation. The set consists of 79 thermoformed sheets featuring tactile objects, such as pretzels, buttons, shells, etc. Teacher's guidebook provides the scripts or stories for each concept. Recommended ages: 4 to 9 years.

On The Way to Literacy Early Experiences for Visually Impaired Children

This handbook and series of 18 storybooks contain vital information and activities to enhance the development of literacy in young blind or visually impaired children. Storybooks introduce large print, tactile illustration, and Braille. Illustrations provide opportunities to use finger and hand skills. The handbooks and storybooks can be purchased separately or as a set. See the APH Product Catalog for a complete listing.

Moving Ahead Series

Storybooks designed to be the next step for students who have had experience with tactile representations (such as the "On the Way to Literacy" series). Moving Ahead storybooks introduce symbolic representation, more complex illustrations, and an increased emphasis on text by combining tactile pictures, print/braille text, and a fun story. Three storybooks are available:

- Goin' on a Bear Hunt (catalog # 6-77903-00); Recommended ages: Pre-Kindergarten to 3rd grade
- Splish the Fish (catalog # 6-77902-00); Recommended ages: Pre-Kindergarten to Kindergarten
- The Boy and the Wolf (catalog # 6-77900-00); Recommended ages: Pre-school through 2nd grade

Lots of Dots: Counting 123 (Catalog # 1-10001-00)

This raised-line coloring book designed for future large print and braille readers presents numbers from 0-30 and integers of 10 up to 90. Each number has two pages. The first page features two or three large braille cells with the number shown with its braille equivalent and a reduced size cells showing which dots need to be colored to complete the number. The second page shows the number and tactile graphic depiction of easy-to-find objects that begin with the same letter as the number, i.e., five fans. A plastic stencil of three large braille cells is attached to the inside front cover. This can be folded over the blank pages, allowing the child to practice the braille cell configuration for the number by tracing or by using the accompanying foam braille chips. Uncontracted braille is used.

Lots of Dots: Learning My ABC's (Catalog # 1-10000-00)

This is an exciting raised-line coloring book designed for future large print and braille readers. It facilitates braille character recognition through repetitive activities. Each letter of the alphabet has two pages. The first page features a jumbo braille cell with six raised-line open circles. The upper and lower case letters are shown with their Braille equivalents along with a reduced-size cell showing which dots need to be filled in to complete the letter. The second page shows the letter and a tactile graphic depiction of an easy-to-find object that begins with that letter. The object is depicted in a tactile graphic format, allowing the student to color it in. Attached to the inside front cover is a plastic stencil of the jumbo cell that can be folded over the blank pages so the student can practice the Braille cell configuration for that letter by tracing or by using the accompanying foam Braille chips.

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